Letters to the Editor

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DIPOLE MOMENTS OF LONG CHAIN DICARBOXYLIC ACIDS

R. J. R. MOHAN RAO AND S. R. PALIT

DEPARTMENT OF PHYSICAL CHEMISTRY,

INDIAN ASSOCIATION FOR THE CULTIVATION OF SCIENCE, JADAVPUR, CALCUTTA-32

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The heterodyne beat apparatus used in our measurements has been designed and constructed by a modification of the circuit used by Stranathan (1934) and Terman (1947). The apparatus has been standardised by determining the dipole moments of known compounds and the values obtained are found to be in good agreement with the literature values.

All the substances are crystallised twice from alcohol and their purity checked by their m.p The solvent *p*-dioxane is purified by the method adopted by Rieche and Milas (1955) The dipole moment is calculated by the following equation deduced by Palit (1952) from the data given in Table 1

$$P_{2_\mu} = \left[\frac{3(\epsilon_1 - n_1^2)}{d_1(\epsilon_1 + 2)(n_1^2 + 2)}\left(1 - \frac{\beta_0}{d_1}\right)\right] + \left[\frac{3\alpha_0}{d_1(\epsilon_1+2)^2}\right] - \left[\frac{6n_1\gamma_0}{d_1(n_1^2+2)^2}\right]$$

TABLE 1

Solvent : *p*-Dioxane Temp : 35°C.

Substance	Formulae	α_0	β_0	γ_0	10^{-18} cgsu
Adipic acid	$(CH_2)_4.(COOH)_2$	3 4975	0 12434	−0.44899	2.50
Azoleic acid	$(CH_2)_7.(COOH)_2$	3 9027	0 89863	−0 17564	2.71
Sebacic acid	$(CH_2)_8$ $(COOH)_2$	3 9999	0 09292	- 0.01901	2.49
Brasylic acid	$(CH_2)_{11}.(COOH)_2$	3 0822	0 49372	−0.09169	2.68
Tridecane 1 : 13 dicarboxylic acid.	$(CH_2)_{13}.(COOH)_2$	2.8185	0 01382	−0 19709	2.35
Hexadecane 1 . 16 dicarboxylic acid.	$(CH_2)_{16}.(COOH)_2$	2 6858	0 01691	0.009438	2.75

where α_0, β_0 and γ_0 are the concentration coefficients of ϵ, d and n respectively which were obtained by statistical least square evaluation for these quantities.

The observed dipole moment for the homologous series of dicarboxylic acids are found to be nearly a constant. This clearly shows that the dipole moment of dicarboxylic acids are independent of the number of (CH_2) groups attached in between the carboxylic acid groups. The dipole moment of adipic acid which we have determined is 2.50 in accordance with the homologous series of dicarboxylic acids where as the dipole moment of adipic acid given by Tseng-Sun-Yao (1944) is 4.04.

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